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L4

TI AB

ANSWER 1 OF 5 BIOSIS COPYRIGHT (c) 2007 The Thomson Corporation on STN The antitumoral mode of action of imiquimod and other imidazoquinolines. Imiquimod, the lead compound of the imidazoquinoline family of nucleoside analogues, has shown good efficacy against a variety of tumors of different origin. The mode of action of imiquimod and related compounds, which we have begun to understand in sorne detail in recent years, is complex and interesting inasmuch as it appears to comprise several presumably mutually enhancing components. Predominant amongst its actions is the induction of pro-inflammatory cytokines through agonistic activity towards Toll-like receptor (TLR)-7 and TLR-8, and consecutively, activation of the central transcription factor NF-kappa This activity stimulates the production of pro-inflammatory cytokines, chemokines and other mediators resulting in activation of antigen-presenting cells and the mounting of a profound Th1-weighted antitumoral cellular immune response. In addition, there are a number of secondary effects on the molecular and cellular level that can be explained through the activation of NF-kappa B. The pro-inflammatory activity of imiquimod appears to be augmented by suppression of a negative regulatory feedback mechanism which normally limits inflammatory responses. This is achieved independent of TLR-7 and TLR-8 through interference with adenosine receptor signaling pathways, particularly the A(2A) subtype, and receptor-independent reduction of adenylyl cyclase activity. Finally, at higher, albeit therapeutically relevant concentrations, imiquimod exerts a pro-apoptotic activity against tumor cells. Induction of apoptosis by imiquimod appears to be dependent on Bcl-2 proteins and involves caspase activation. The combination of multiple, presumably synergistic anti-tumoral functions by a single compound represents an interesting principle of pathogenesis-oriented,

anti-neoplastic therapy.

2007:215335 BIOSIS ACCESSION NUMBER: DOCUMENT NUMBER: PREV200700214472

TITLE: The antitumoral mode of action of imiguimod and other

imidazoquinolines.

Schoen, Margarete; Schoen, Michael P. [Reprint Author] AUTHOR(S):

Univ Wurzburg, Rudolf Virchow Ctr, DFG Res Ctr Expt Biomed, CORPORATE SOURCE:

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Current Medicinal Chemistry, (2007) Vol. 14, No. 6, pp. SOURCE:

681-687.

ISSN: 0929-8673.

DOCUMENT TYPE:

Article

LANGUAGE:

English

ENTRY DATE:

Entered STN: 28 Mar 2007

Last Updated on STN: 28 Mar 2007

ANSWER 2 OF 5 BIOSIS COPYRIGHT (c) 2007 The Thomson Corporation on STN L4 The small antitumoral immune response modifier imiquimod interacts with ΤI adenosine receptor signaling in a TLR7-and TLR8-independent fashion.

Imiquimod, a small-molecule immune response modifier of the AB imidazoquinoline family, has shown profound antitumoral and antiviral efficacy both in vitro and in clinical applications in vivo. has been demonstrated that this activity is mediated through the Toll-like receptor (TLR) 7- and TLR8-signaling cascade resulting in the secretion of proinflammatory cytokines and, consecutively, induction of a tumor-directed cellular immune response. In addition, imiquimod exerts a direct proapoptotic activity in tumor cells. We demonstrate here that imiquimod induces activation of the transcription factor NF-kappa B and the downstream production of proinflammatory cytokines in the absence of TLR7 and TLR8. In Chinese hamster ovary cells stably transfected with the human adenosine receptor subtypes, we then show in radioligand-binding competition experiments that imiquimod binds to adenosine receptors at concentrations relevant in clinical settings, with highest affinities to the A(1) and A(2A) subtypes. The effect on the receptor-mediated activation of adenylyl cyclase was also studied, and these experiments revealed that imiquimod acts as an adenosine receptor antagonist. In addition, imiquimod had an inhibitory effect on adenylyl cyclase activity downstream from the receptor. Finally, using transformed human keratinocytes, we provide experimental evidence that imiquimod and A2A adenosine receptor-specific compounds similarly induce proinflammatory cytokines in the absence of immune cells. Thus, imiquimod appears to suppress an important feedback mechanism of inflammation by antagonism of adenosine receptor-dependent increase of cAMP and a concomitant receptor-independent inhibition of cAMP production. These novel mechanisms presumably act synergistic with the positive induction of proinflammatory cytokines and can, at least in part, explain the profound inflammation observed in some patients in vivo.

ACCESSION NUMBER: 2006:603217 BIOSIS DOCUMENT NUMBER: PREV200600613866

TITLE: The small antitumoral immune response modifier imiquimod

interacts with adenosine receptor signaling in a TLR7-and

TLR8-independent fashion.

Schoen, Michael P. [Reprint Author]; Schoen, Margarete; AUTHOR (S):

Klotz, Karl-Norbert

CORPORATE SOURCE: Univ Wurzburg, Rudolf Virchow Ctr, DFG Res Ctr Expt Biomed,

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SOURCE: Journal of Investigative Dermatology, (JUN 2006) Vol. 126,

No. 6, pp. 1338-1347.

CODEN: JIDEAE. ISSN: 0022-202X.

DOCUMENT TYPE:

Article English

LANGUAGE: ENTRY DATE:

Entered STN: 15 Nov 2006

Last Updated on STN: 15 Nov 2006

ANSWER 3 OF 5 BIOSIS COPYRIGHT (c) 2007 The Thomson Corporation on STN L4

Polymorphisms in TLR7 and 8 affect severity of hepatic fibrosis and ΤI inflammation in individuals infected with the hepatitis C virus from a single source.

Background and Aims: Toll-like receptors (TLRs) are type I transmembrane AB proteins, which are highly conserved through evolution. They activate innate immunity by recognizing and binding, to a wide variety of pathogenic substances. TLR7 and 8 both respond to the synthetic imidazoquinoline compounds, known to have anti-viral properties. TLR7 and probably TLR8 have also been demonstrated to recognize single stranded viral RNA. This study aimed to assess the involvement of inherited variations in TLR7 and 8 in determining disease outcome in HCV infected individuals. Methods: 223 women all exposed to HCV genotype 1b from a single donor, and including 85 who had spontaneously cleared the virus and 138 chronically infected, were genotyped for TLR 7 and 8 polymorphisms and haplotype tagging was performed. The frequencies of these polymorphisms were then compared with disease activity and severity. Results: TLR 7 and 8 genotypes were compared with HCV PCR status, ALT levels and liver histology. There was no association between HCV PCR status and the TLR polymorphisms. Of the 5 SNPs examined in TLR8, wild types were associated with significantly worse fibrosis for 2 SNP loci (TLR8C (C401T); 1.38 vs 0.78, p = 0.03, TLR8D (C426T); 1.39 vs. 0.70, p =0.018). Degree of inflammation was worse in TLR8B (A796C) wild type; 5.1 vs. 4.2, p = 0.008, and this group also had higher ALT levels; 66 vs. 41, p = 0.018. TLR7B (C149T) was associated with lower inflammation and 4.4 vs. 5.7, p = 0.015 ALT levels; 47.8 vs. 73.4, p = 0.014. On analysis of haplotypes, those containing the minor allele for TLR8A or TLR8B had significantly less fibrosis (p = 0.025, p < 0.01, respectively). Haplotypes containing the minor allele for TLT7B had significantly lower inflammatory scores, p < 0.025. No haplotype was associated with viral clearance. Conclusion: Consistent with prior functional data regarding viral clearance, HCV viral clearance was not associated with any of the TLR 7 or 8 SNPs examined in this study. However, SNPs in TLR 7 and 8 were associated with a lesser degree of hepatic inflammation and fibrosis. Further functional characterisation of these SNPs could provide important information on the response of the host to HCV infection.

ACCESSION NUMBER: DOCUMENT NUMBER:

2006:499496 BIOSIS PREV200600505816

TITLE:

Polymorphisms in TLR7 and 8 affect severity of hepatic fibrosis and inflammation in individuals infected with the

hepatitis C virus from a single source.

AUTHOR (S):

Goulding, Carol A.; Mc Manus, Ross; Murphy, Anne; Mac Donald, George S.; Dring, Megan; Hegarty, John; Kiernan,

Susan Me; Kelleher, Dermot

SOURCE:

Gastroenterology, (APR 2006) Vol. 130, No. 4, Suppl. 2, pp.

A780.

Meeting Info.: Digestive Disease Week Meeting/107th Annual Meeting of the American-Gastroenterological-Association. Los Angeles, CA, USA. May 19 -24, 2006. Amer Gastroenterol

Assoc Inst.

CODEN: GASTAB. ISSN: 0016-5085.

DOCUMENT TYPE:

Conference; (Meeting)

Conference; (Meeting Poster)

LANGUAGE:

English ENTRY DATE:

Entered STN: 4 Oct 2006

Last Updated on STN: 4 Oct 2006

· L4 ANSWER 4 OF 5 BIOSIS COPYRIGHT (c) 2007 The Thomson Corporation on STN ΤI Immune modulation and apoptosis induction: Two sides of the antitumoral activity of imiquimod.

Imiquimod, the first member of the imidazoquinoline family of AB immune response modifiers, has proven good clinical efficacy against basal

cell carcinomas and actinic keratoses in several independent studies. addition, there is recent evidence that imiquimod is also efficacious against other tumors such as cutaneous metastases of malignant melanoma or vascular tumors. Imiquimod exerts its antitumoral effect, at least in part, through binding to TLR-7 and TLR-8 on dendritic cells followed by secretion of a multitude of proinflammatory cytokines. The net result of this proinflammatory activity is a profound tumor-directed cellular immune response. However, recent experimental and clinical data indicate that imiguimod also possesses considerable direct proapoptotic activity against tumor cells both in vitro and in vivo. novel mode of action appears to be independent of membrane bound death receptors, but involves caspase activation. Induction of apoptosis by imiquimod is, at least in part, presumably mediated through Bcl-2-dependent release of mitochondrial cytochrome c and subsequent activation of caspase-9. The structural analogue, resiguimod, exhibited very limited, if any, such proapoptotic activity, possibly due to its lacking ability to enter the cell. Bypassing molecular mechanisms of apoptosis deficiency by a topical compound may be of great utility for treating certain cutaneous tumors.

ACCESSION NUMBER: 2004:282528 BIOSIS DOCUMENT NUMBER: PREV200400282627

TITLE: Immune modulation and apoptosis induction: Two sides of the

antitumoral activity of imiquimod.

Schoen, M. P. [Reprint Author]; Schoen, M. AUTHOR(S):

CORPORATE SOURCE: Rudolf Virchow CtrDFG Res Ctr Expt Biomed, Univ Wurzburg,

Versbacher Str 9, D-97078, Wurzburg, Germany

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SOURCE: Apoptosis, (May 2004) Vol. 9, No. 3, pp. 291-298. print.

ISSN: 1360-8185 (ISSN print).

DOCUMENT TYPE: Article

General Review; (Literature Review)

LANGUAGE: English

ENTRY DATE: Entered STN: 9 Jun 2004

Last Updated on STN: 9 Jun 2004

ANSWER 5 OF 5 WPIDS COPYRIGHT 2007 L4THE THOMSON CORP on STN

TI Immunostimulatory combination for inducing toll like receptor 8-mediated biological activity e.g. synthesis of cytokine for treating e.g. cancer comprises toll like receptor 8 agonist in combination with immunostimulatory oligonucleotide

ΑN 2006-424284 [43] WPIDS

AΒ WO 2006063152 A2 UPAB: 20060706

NOVELTY - An immunostimulatory combination (C1) comprises a toll like receptor (TLR)8 agonist in combination with an immunostimulatory oligonucleotide to induce at least one TLR8-mediated biological activity.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for inducing TLR8-mediated biological activity in immune cells, involving contacting the immune cells with (C1) to increase a TLR8-mediated biological activity of the cells to a greater extent than contacting the immune cells with the TLR8 agonist without the immunostimulatory oligonucleotide.

ACTIVITY - Immunostimulant; Cytostatic; Antiinflammatory; Dermatological; Immunosuppressive; Virucide; Antibacterial; Fungicide; Antimalarial; Respiratory-Gen.; Keratolytic; Anti-HIV; Antiasthmatic; Antiallergic; Neuroprotective; Vulnerary.

MECHANISM OF ACTION - Toll like receptor (TLR)8 agonist; Tumor necrosis factor (TNF) production inhibitor; Interleukin (IL)-12 production inhibitor. A combination (test) comprising 2-propylthiazolo(4,5-c)quinolin-4-amine (IRM) (3 muM) and 5'-TCGTCGAACGTTCGAGATGAT-3' (CpG ODN M352) (10 muM) was prepared and tested for TLR8 agonistic activity using HEK 293 cells. Cell aliquots were treated by (C1). As controls, some cell aliquots were incubated with 3 muM of IRM only (positive control) and other cell aliquots were incubated with (CpG ODN M352) only (negative control). In all cases, the cells were incubated overnight at 37degreesC with 5% CO2 and 98% humidity. Each well of the plate was read on a L-max luminometer. The data was expressed as fold increase of luciferase induction in cell aliquots incubated with the indicated stimulant compared to the negative control. The fold increase for test/positive control/negative control was found to be approximately 104/approximately 39/approximately 0.5.

USE - For inducing at least one toll like receptor (TLR) 8-mediated biological activity (e.g. synthesis of a cytokine such as tumor necrosis factor (TNF) and interleukin (IL)-12, synthesis of a chemokine, synthesis of co-stimulatory markers, maturation of antigen-presenting cells and proliferation of B lymphocytes) in immune cells (e.g. peripheral blood mononuclear cells (PBMCs) and monocyte-derived dendritic cells) (claimed). The combination is used for treatment of cancer; lupus erythematosus; viral diseases; bacterial diseases; other infectious diseases such chlamydia; fungal diseases including aspergillosis, histoplasmosis, cryptococcal meningitis and parasitic diseases (including malaria, pneumocystis carnii pneumonia, leishmaniasis, cryptosporidiosis, toxoplasmosis and trypanosome infection); neoplastic diseases such as intraepithelial neoplasias, cervical dysplasia, actinic keratosis, basal cell carcinoma, squamous cell carcinoma, Kaposi's sarcoma, melanoma, renal cell carcinoma, leukemia; TH2-mediated atopic diseases such as atopic dermatitis and eczema, eosinophilia, asthma, allergy, allergic rhinitis and Ommen's syndrome; autoimmune diseases such as systemic lupus erythematosus, thrombocythemia, multiple sclerosis, discoid lupus, alopecia areata; and diseases associated with wound repair such as inhibition of keloid formation and other types of scarring (e.g. enhancing wound healing, including chronic wounds). The combination can be used in the treatment of humans, rodents, dogs, cats, horses, pigs, sheep, goats, or cows.

ADVANTAGE - The combination can provide greater immunostimulatory activity than either component can provide alone i.e. can provide at least two-fold (preferably at least three-fold, especially at least five-fold) even greater increase in at least one toll like receptor (TLR) 8-mediated biological activity compared to that induced by a TLR8 agonist administered without the immunostimulatory oligonucleotide; can provide synergistic immunostimulatory activity; improves the efficacy of certain immunological treatments that involves a TLR8-mediated biological activity; enhances vaccine-induced TLR8-mediated biological activity to improve the efficacy of the vaccine - even to the point of enabling a vaccine previously considered ineffective to be considered effective; and can enable some immunological treatments to be clinically and/or commercially viable that previously had been considered clinically and/or commercially undesirable because of cost of a component of the treatment, availability of all components and/or the amount of a component (e.g. an antigen) previously considered necessary to generate an effective immune response also generated an undesirable level of side effects.

ACCESSION NUMBER:

2006-424284 [43] WPIDS

DOC. NO. CPI:

C2006-133823 [43]

TITLE:

Immunostimulatory combination for inducing toll

like receptor 8-mediated

biological activity e.g. synthesis of cytokine for

treating e.g. cancer comprises toll

like receptor 8 agonist in

combination with immunostimulatory oligonucleotide

B02; B03; C02

DERWENT CLASS: INVENTOR:

GORDEN K B; QIU X; WIGHTMAN P D

PATENT ASSIGNEE:

(MINN-C) 3M INNOVATIVE PROPERTIES CO

COUNTRY COUNT:

111

PATENT INFO ABBR.:

PATENT NO KIND DATE WEEK LA PG MAIN IPC

NO 2000003132

WO 2006063152 A2 20060615 (200643)* EN 39[9]

APPLICATION DETAILS:

PATENT NO KIND APPLICATION DATE

WO 2006063152 A2 WO 2005-US44448 20051208

PRIORITY APPLN. INFO: US 2004-634146P 20041208